IN THE DRAWINGS

Please amend the drawings as follows:

The attached sheet of drawings includes changes to FIG. 1C. This sheet, which includes FIG. 1C, replaces the original sheet. In FIG. 1C, a processor 103 comprising a software module 107 has been added to receiver 104. Also, "TO DEMOD/DECODER" has been changed to a logic block labeled with reference numeral 109.

Attachment: Replacement Sheet

                    Annotated Sheet showing Changes

REMARKS

Claims 1-37 are pending in the present application. Claims 8-10 and 27-29 have been allowed. In the above amendments, claims 1, 14, 17, 20 and 37 have been amended. Applicants believe these amendments add no new matter to the application and are fully supported by the original disclosure. Support for the amendments is found throughout the specification and is found, in particular, in paragraphs [1047] to [1051] and FIG. 6.

In the Office Action mailed October 20, 2005, the Examiner objected to the drawings under 37 CFR 1.83(a) stating the drawings must show every feature of the invention specified in the claims.

Claims 1-3, 14, 15, 20-22 and 30-32 are rejected under 35 U.S.C. §102(e) as being anticipated by Rafie et al. (US 6,628,707).

Claims 4, 11-13, 16, 23 and 33 are rejected under 35 U.S.C. §103(a) as being unpatentable over Rafie et al. (US 6,628,707) in view of Strodtbect et al. (US 6,680,985).

Claims 5, 6, 24, 25, 34 and 35 are rejected under 35 U.S.C. §103(a) as being unpatentable over Rafie et al. (US 6,628,707) in view of Wells et al. (US 6,310,915).

Claims 7, 26 and 36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Rafie et al (US 6,628,707) in view of Wells et al. (US 6,310,915) further in view of Strodtbeck et al. (US 6,680,985).

Claims 17, 18 and 37 are rejected under 35 U.S.C.§103(a) as being unpatentable over Rafie et al. (US 6,628,707) in view of Marchetto et al. (US 5,914,959).

Claim 19 is rejected under 35 U.S.C. §103(a) as being unpatentable over Rafie et al. (US 6,628,707) in view of Marchetto et al. (US 5,914,959) further in view of Strodtbeck et al. (US 6,680,985).

Applicant respectfully responds to this Office Action.

Drawings

In the Office Action mailed October 20, 2005, the Examiner objected to the drawings under 37 CFR 1.83(a) stating the drawings must show every feature of the invention specified in

the claims. The Examiner concludes by stating that "the claimed features of claims 20-37 must be shown or the features canceled from the claims."

In response, Applicants point to the following features already disclosed in the drawings and amends FIG. 1C and paragraph [1030] to provide added clarification. With respect to claim 20, the apparatus for estimating a signal to interference-plus-noise ratio (SINR) of a wireless channel is receiver 104 is shown in FIG. 1C. Frames having a pilot portion and a non-pilot portion are disclosed in FIG. 2 and labeled with reference numeral 200. A wireless channel is labeled with reference numeral 110 and disclosed in FIGs. 1A, 1B and 1C. An adaptive equalizer is disclosed in FIG. 1C and labeled with reference numeral 108. The means for determining a parameter using said output and means for estimating a SINR of the wireless channel using said parameter are disclosed in FIG. 3, steps 306 and 308 respectively. The means for calculating a SINR compensation factor using said SINR estimate is disclosed in FIG. 6, step 606.

With respect to claim 21, the non-pilot portion comprises a control portion is disclosed in FIG. 2, and labeled with reference numeral 204. The output of said adaptive equalizer during said control portion comprises a soft estimate of said control symbols is the $\hat{y}$ symbol disclosed in FIG. 1C and paragraph [1042]. The means for applying a hard decision to said soft estimate, resulting in a hard estimate of said control symbols is disclosed in FIG. 4, step 402 and the means for calculating said parameter using said soft estimate and said hard estimate is disclosed in FIG. 4, step 404.

With respect to claim 24, the non-pilot portion comprises a data portion is disclosed in FIG. 2 and labeled with reference numeral 206, the output of said adaptive equalizer during said data portion comprises a soft estimate of said encoded data bits is the $\hat{y}$ symbol disclosed in FIG. 1C and disclosed in paragraph [1045], a channel decoder configured to decode said soft estimate is disclosed in FIG. 1C as DEMOD/DECODER. DEMOD/DECODER has been labeled with reference numeral 109. The means for re-encoding said decoded data bits and calculating said parameter using said soft estimate and said re-encoded data bits are disclosed FIG. 5, steps 502 and 504 respectively.

With respect to claims 27-29, the apparatus for estimating a signal to interference-plus-noise ratio (SINR) of a wireless channel is receiver 104 is shown in FIG. 1C. Frames having a

pilot portion and a non-pilot portion are disclosed in FIG. 2 and labeled with reference numeral 200. A wireless channel is labeled with reference numeral 110 and disclosed in FIGs. 1A, 1B and 1C. An adaptive equalizer is disclosed in FIG. 1C and labeled with reference numeral 108. The means for determining a parameter using said output, and the means for estimating a SINR of the wireless channel using said parameter are disclosed in FIG. 3, steps 306 and 308 respectively. The means for determining a second parameter using said pilot output, the means for estimating the SINR of the wireless channel using said second parameter, resulting in a pilot SINR estimate, the means for calculating a SINR compensation factor using said non-pilot SINR estimate and said pilot estimate, the means for smoothing said SINR compensation factor over a plurality of frames, and the means for adjusting said pilot SINR estimate according to said smoothed SINR compensation factor is disclosed in FIG. 6, steps 602, 604, 606, 608 and 610 respectively.

With respect to claim 30, the apparatus for estimating a signal to interference-plus-noise ratio (SINR) of a wireless channel which comprises receiver 104 is shown in FIG. 1C. A wireless channel is labeled with reference numeral 110 and disclosed in FIGs. 1A, 1B and 1C. Frames having a pilot portion and a non-pilot portion are disclosed in FIG. 2 and labeled with reference numeral 200. An adaptive equalizer is disclosed in FIG. 1C and labeled with reference numeral 108. Said receiver configured to determine a parameter using said output, said receiver configured to estimate the SINR of the wireless channel using said parameter are disclosed in FIG. 3, steps 306 and 308 respectively. The receiver configured to calculate a SINR compensation factor using said SINR estimate is disclosed in FIG. 6, step 606.

With respect to claim 31, the non-pilot portion comprises a control portion is disclosed in FIG. 2, and labeled with reference numeral 204. The output of said adaptive equalizer during said control portion comprises a soft estimate of said control symbols is the $\hat{y}$ symbol disclosed in FIG. 1C and paragraph [1042]. The receiver configured to apply a hard decision to said soft estimate, resulting in a hard estimate of said control symbols is disclosed in FIG. 4, step 402 and said receiver configured to calculate said parameter using said soft estimate and said hard estimate is disclosed in FIG. 4, step 404.

With respect to claim 34, the non-pilot portion comprises a data portion is disclosed in FIG. 2 and labeled with reference numeral 206, the output of said adaptive equalizer during said

data portion comprises a soft estimate of said encoded data bits is the $\hat{y}$ symbol disclosed in FIG. 1C and disclosed in paragraph [1045], a channel decoder configured to decode said soft estimate is disclosed in FIG. 1C as DEMOD/DECODER. DEMOD/DEC ODER has been labeled with reference numeral 109. The receiver configured to re-encode said decoded data bits and calculate said parameter using said soft estimate and said re-encoded data bits are disclosed FIG. 5, steps 502 and 504 respectively.

With respect to claim 37, the transmitter is labeled with reference numeral 102 and is shown in FIG. 1C. Frames having a pilot portion and a non-pilot portion are disclosed in FIG. 2 and labeled with reference numeral 200. A wireless channel is labeled with reference numeral 110 and disclosed in FIGs. 1A, 1B and 1C. The receiver is labeled with reference numeral 104 is shown in FIG. 1C. An adaptive equalizer is disclosed in FIG. 1C and labeled with reference numeral 108. The means for estimating a signal to interference-plus-noise ratio (SINR) of the wireless channel using said output is disclosed in FIG. 3, step 308. The means for calculating a SINR compensation factor using said SINR estimate is disclosed in FIG. 6, step 606. The means for selecting a data rate control (DRC) value using said SINR, and the means for transmitting said DRC value to said transmitter via said wireless channel is disclosed in FIG. 3, step 304 and FIG. 1B.

In paragraph [1059], the specification states that "[t]he steps of a method or algorithm described in connection with the embodiments disclosed herein may be embodied directly in hardware, in a software module executed by a processor, or in a combination of the two." In paragraph [1028], the specification states "[r]eceiver 104 may be configured to perform the operations described herein in hardware, software, or a combination of both." Receiver 104 has been amended to include a processor 103 comprising a software module 107. The software module 107 includes instructions which embody the steps disclosed in FIGs. 3-7. Thus, the means of claims 20 through 37 is the processor 103 and software module 107 combination located in the receiver 104. FIG. 1C has been amended to clarify this feature. In addition, paragraph [1030] has been amended to clarify this feature. Applicants submit that the above amendments to the drawings and specification do not make any substantive changes or introduce any new material. Therefore, approval and entry of the above amendments are respectfully requested.

<u>Claims 1-3, 14, 15, 20-22 and 30-32</u>

The Examiner rejected claims 1-3, 14, 15, 20-22 and 30-32 under 35 U.S.C. §102(e) as being anticipated by Rafie et al. (US 6,628,707).

Rafie does not anticipate claims 1-3, 14, 15, 20-22 and 30-32 because Rafie does not disclose all the features of these claims. For example, Rafie does not disclose "determining a parameter using said output." The Examiner states in paragraph 2 on page 2 that "[t]he signal 551 is the parameter." Applicants respectfully disagree with the Examiner. Signal 551 represents equalizer weights $C_{i,j}(n)$ which are stored in memory 512. See FIG. 5, col. 11, lines 3-23 and col. 12, line 66 to col. 13, line 15. The equalizer weights are produced by the adaptive equalizer 506 using a complex LMS algorithm. Col. 11, lines 21-23. Nowhere does Rafie state that the equalizer weights are used to "estimat[e] the SINR" as disclosed in claim 1. Instead Rafie states that the selection of an adaptive scale factor μ_k is . . . based on the estimated signal-to-noise ratio, SNR, at the output of the equalizer . . ." Col. 11, lines 60-62.

A second feature of claims 1-3, 14, 15, 20-22 and 30-32 missing from Rafie is "estimating the SINR of the wireless channel using said parameter." Rafie does not disclose how the SNR is calculated. Furthermore, even if the SNR was estimated "at the output of the equalizer" as the Examiner states, the output referred to by Rafie is the "equalized output signal $y_{i,j}(n)$ in FIG. 5, and not the equalizer weights $C_{i,j}(n)$ which the Examiner argues is a parameter." See col. 10, lines 64-66. The adaptive equalizer 506 produces an equalized output signal $y_{i,j}(n)$ in FIG. 5. It also provides next burst equalizer weights $C_{i,j}(n)$.

Furthermore, with respect to claims 23 and 33, although Rafie discloses estimated data symbols, the Examiner has failed to point out where Rafie discloses both soft and hard estimates, "calculating a parameter using said soft estimate and said hard estimate" found in claim 21 and "calculate said parameter using said soft estimate and said hard estimate" found in claim 31.

Last, the feature "calculating a SINR compensation factor using said SINR estimate" has been added to claims 1, 14 and 20. This element is not found in the prior art cited by the Examiner. Since all the features of claims 1-3, 14, 15, 20-22 and 30-32 are not disclosed by Rafie, Rafie does not anticipate claims 1-3, 14, 15, 20-22 and 30-32.

Claims 4, 11-13, 16, 23 and 33

Claims 4, 11-13, 16, 23 and 33 are rejected under 35 U.S.C. §103(a) as being unpatentable over Rafie et al. (US 6,628,707) in view of Strodtbect et al. (US 6,680,985).

The Examiner argues that Strodbeck using a bias to adapt the equalizer. The Examiner then concludes that it "would have been obvious for one of ordinary skill in the art at the time of the invention to incorporate Strodbeck's method of using a bias [to] eliminate errors and thereby increase the SNR in the apparatus and method of Rafie." However, using a bias [to] eliminate errors and thereby increase the SNR does not satisfy the features of claim 4. Claim 4 discloses "determining a parameter using said output, wherein said parameter comprises a bias; and estimating the SINR of the wireless channel using said parameter." The Examiner has failed to point out where the bias disclosed in Strodbeck is used to estimate the SINR of the wireless channel.

In addition, with respect to claims 11 and 13, the Examiner has failed to point out where the combination of Rafie et al. in view of Strodtbect et al. discloses the feature "said estimating comprises estimating the SINR of the wireless channel using said first and second parameters."

Furthermore, with respect to claims 23 and 33, as stated above the Examiner has failed to point out where the combination of Rafie et al. in view of Strodtbect et al. discloses the feature "calculating said parameter using said soft estimate and said hard estimate" found in claim 21 and "calculate said parameter using said soft estimate and said hard estimate" found in claim 31 from which claims 23 and 33 respectively depend. Since all the features of claims 4, 11-13, 16, 23 and 33 are not disclosed by the combination of Rafie et al. in view of Wells et al., claims 4, 11-13, 16, 23 and 33 are patentable. These claims are also patentable because they depend on allowable claims 1, 20 and 30.

Claims 5, 6, 24, 25, 34 and 35

The Examiner rejected claims 5, 6, 24, 25, 34 and 35 under 35 U.S.C. §103(a) as being unpatentable over Rafie et al. (US 6,628,707) in view of Wells et al. (US 6,310,915).

The Examiner states that although Rafie does not disclose decoding and re-encoding the received data prior to estimating the SNR, Wells states it is desired to re-encode a previously encoded signal. The Examiner then concludes that claims 5, 6, 24, 25, 34 and 35 are

unpatentable over Rafie et al. in view of Wells et al. However, the Examiner has failed to point out where the combination of Rafie et al. in view of Wells et al. discloses a number of features found in the above recited claims. For example, the Examiner has failed to point out where the feature "calculating said parameter using said output and said re-encoded data bits" taught by claim 5, "means for calculating said parameter using said soft estimate and said re-encoded data bits" taught by claim 24, and "said receiver is further configured to calculate said parameter using said soft estimate and said re-encoded data bits" taught by claim 34 are disclosed. Since all the features of claims 5, 6, 24, 25, 34 and 35 are not disclosed by the combination of Rafie et al. in view of Wells et al., claims 5, 6, 24, 25, 34 and 35 are patentable. These claims are also patentable because they depend on allowable claims 1, 20 and 30.

Claims 7, 26 and 36

The Examiner rejected claims 7, 26 and 36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Rafie et al (US 6,628,707) in view of Wells et al. (US 6,310,915) further in view of Strodtbeck et al. (US 6,680,985).

The Office Action contends that Strodtbeck discloses using a bias to adapt the equalizer shown in figure 1. However, Strodtbeck does not teach or suggest determining a parameter using said output, and estimating the SINR of the wireless channel using said parameter as cited in claims 1, 20, and 30.

In the present case, claims 7, 26, and 36 depend from claims 1, 20, and 30 and therefore include all the limitations of those independent claims such as determining a parameter using said output and estimating the SINR of the wireless channel using said parameter. As previously explained, such limitations are not disclosed in Rafie. Accordingly, because the combination of Rafie and Wells and further in view of Strodtbeck does not teach or suggest all of the limitations found in claims 7, 26, and 36, these references do not render the present claims prima facie obvious under 35 U.S.C. § 103(a). Withdrawal of this rejection is respectfully requested.

Claims 17, 18 and 37

Claims 17, 18 and 37 are rejected under 35 U.S.C.§103(a) as being unpatentable over Rafie et al. (US 6,628,707) in view of Marchetto et al. (US 5,914,959).

The Examiner states that Rafie does not disclose selecting the rate for the transmission of data using the SNR. The Examiner then states that Marchetto discloses a scheme that reduces the data transmission rate as the SNR becomes poor.

Claims 17, 18 and 37 are patentable because the combination of Rafie and Marchetto does not disclose all the features of these claims. For example, with respect to claims 17 and 18 and as stated above with respect to claims 1-3, 14, 15, 20-22 and 30-32, Rafie does not disclose "determining a parameter using said output." The Examiner states in paragraph 2 on page 2 that "[t]he signal 551 is the parameter." Applicants respectfully disagree with the Examiner. Signal 551 represents equalizer weights $C_{i,j}(n)$ which are stored in memory 512. See FIG. 5, col. 11, lines 3-23 and col. 12, line 66 to col. 13, line 15. The equalizer weights are produced by the adaptive equalizer 506 using a complex LMS algorithm. Col. 11, lines 21-23. Nowhere does Rafie state that the equalizer weights are used to "estimat[e] the SINR" as disclosed in claim 17. Instead Rafie states that the selection of an adaptive scale factor μ_k is . . . based on the estimated signal-to-noise ratio, SNR, at the output of the equalizer . . ." Col. 11, lines 60-62.

A feature of claims 17, 18, and 37 missing from Rafie is "estimating a signal to interference-plus-noise ratio (SINR) of the wireless channel using said parameter" (claim 17) and "means for estimating a signal to interference-plus-noise ratio (SINR) of the wireless channel using said output" (claim 37) because Rafie does not disclose how the SNR is calculated. Furthermore, even if the SNR was estimated "at the output of the equalizer" as the Examiner states, the output referred to by Rafie is the "equalized output signal $y_{i,j}$ (n) in FIG. 5, and not the equalizer weights $C_{i,j}(n)$ which the Examiner argues is a parameter." See col. 10, lines 64-66. The adaptive equalizer 506 produces an equalized output signal $y_{i,j}$ (n) in FIG. 5. It also provides next burst equalizer weights $C_{i,j}(n)$.

Last, the feature "calculating a SINR compensation factor using said SINR estimate" has been added to claims 17 and 37. This feature is not found in the prior art cited by the Examiner. Since all the features of claims 17, 18 and 37 are not disclosed by the combination of Rafie in view of Marchetto et al., claims 17, 18 and 37 are patentable.

Claim 19

The Examiner rejected claim 19 under 35 U.S.C. §103(a) as being unpatentable over Rafie et al. (US 6,628,707) in view of Marchetto et al. (US 5,914,959) further in view of Strodtbeck et al. (US 6,680,985).

The Office Action contends that Strodtbeck discloses using a bias to adapt the equalizer shown in figure 1. However, Strodtbeck does not teach or suggest determining a parameter using said output, and estimating the SINR of the wireless channel using said parameter as cited in claim 17.

Applicants thus respectfully submit that claim 17 is not rendered obvious by Rafie when considered alone or in combination with Marchetto and Strodtbeck. In the present case, claim 19 depends from claim 17 and therefore includes all the limitations of that independent claim such as determining a parameter using said output and estimating the SINR of the wireless channel using said parameter. As previously explained, such limitations are not disclosed in Rafie. Accordingly, because the combination of Rafie and Marchetto and further in view of Strodtbeck does not teach or suggest all of the limitations found in claim 19 these references do not render the present claim prima facie obvious under 35 U.S.C. § 103(a). Withdrawal of this rejection is respectfully requested.

REQUEST FOR ALLOWANCE

In view of the foregoing, Applicant submits that all pending claims in the application are patentable. Accordingly, reconsideration and allowance of this application are earnestly solicited. Should any issues remain unresolved, the Examiner is encouraged to telephone the undersigned at the number provided below.

Respectfully submitted,

Dated: 12/20/05

By: Larry J. Moskowitz, Reg. No. 42,911
(858) 651-4556

QUALCOMM Incorporated
5775 Morehouse Drive
San Diego, California 92121
Telephone: (858) 651-4125
Facsimile: (858) 658-2502